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POLYCHAETOUS ANNELIDS FROM THE INTERTIDAL ROCKY SUBSTRATUM OF A POLLUTED AREA OF THE RÍA DE PONTEVEDRA (GALICIA, SPAIN) 2. TAXONOMIC ASPECTS WITH THE DESCRIPTION OF *LUGIA ATLANTICA,* N. SP.

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Abstract.—Some taxonomic aspects derived from a study of the taxocoenosis of polychaetes inhabiting the intertidal zone of an area in the ría de Pontevedra (NW of Spain), affected by industrial wastes, are presented. A new species, *Lugia atlantica* (Phyllodocidae), is described, and detailed descriptions of specimens of the genus *Micronereis* Claparède (Nereididae) and family Capitellidae with dubious taxonomic positions, are offered.

In a previous report (Villalba & Viéitez 1985), the taxocoenosis of polychaetous annelids inhabiting the intertidal zone of an area in the ría de Pontevedra was studied, and the effects of industrial wastes from Kraftpaper and chlorine-soda factories on these components of the benthic fauna were discussed. Among the sampled material, some specimens with interesting taxonomic implications were found. These are described and discussed below.

Three sampling stations were established on the southern side of the estuary (Fig. 1). The studied area, sampling stations, material and methods are described elsewhere (Villalba & Viéitez 1985).

Family Phyllodocidae Williams, 1851
Genus *Lugia* Quatrefages, 1865
Lugia atlantica, new species
Fig. 2

Lugia sp. Villalba & Viéitez, 1985:376.
Phyllodocidae ind. Villalba & Viéitez, 1985: 373–376.

Material examined.—Sta M (42°24'N, 05°00'W), lowest intertidal band, holotype and paratype. Sta A, intertidal band of *Ulva rigida* and *Fucus vesiculosus,* paratype. Sta B, intertidal band of *U. rigida* and *F. vesiculosus,* paratype. All specimens deposited in the collection of the Zoology Department of the University of Alcalá de Henares, Madrid.

Description of holotype.—Elongate body, tapering anteriorly and posteriorly, with constriction on segment 10, at level of end of inverted proboscis. Segments 25, 1.8 mm long and 0.4 mm wide. Prostomium round, slightly bilobed, about as wide as long; narrower anterior end with 4 cirriform antennae of equal length, slightly shorter than prostomium (Fig. 2A). Without median antennae or nuchal papilla. One pair of lensed eyes on posterior part of prostomium. Proboscis inverted; when observed through body wall it consisted of wider region with papillae and perhaps narrower bare region.

Segment 1 dorsally distinct from prostomium, with pair of tentacular cirri tapering gradually distally, longer than antennae. Segment 2 with pair of similar dorsal tentacular cirri but twice as long; setal lobes with aciculum and setae; pair of ventral cirri shorter than dorsal tentacular ones, but longer than following ventral cirri; similar in shape and size to remaining dorsal cirri.

Tentacular formula: $1 + S\frac{1}{N} + S\frac{N}{N}$ (Fig. 2A).

Parapodia uniramous; from segment 3 consisting of lanceolate dorsal cirrus, setigerous lobe with aciculum and setae, and shorter, oval ventral cirrus. Setal lobes with 2 rounded presetal lobes of equal size. Aciculum with blunt tip and very slender extension protruding from setal lobe (Fig. 2D). Setae of 2 kinds: compound setae variable in number per parapodium, from 3 setae in 2nd segment to 9 in middle region of body. Compound setae consisting of smooth shaft with swollen joint bearing bundle of very small spines and 2 larger unequal spines; blades minutely serrated, with obliquely striated surface (Fig. 2B); simple setae, single one in parapodia of segments 20 to 23, with very finely serrated distal tip (Fig. 2C). Parapodia of posterior 2 segments very reduced, without setae, perhaps area of active growth. Anal cirri lacking.

Color in formalin light brown with darker spots.

Paratypes.—Segments from 25 to 28. One specimen with proboscis slightly everted, showing portion covered with fleshy papillae. Number of posterior segments bearing simple setae from 2 to 6. All of paratypes with 2 lanceolate anal cirri, slightly longer than dorsal cirri of middle region.

Remarks.—Quatrefages (1866:152) included *Eteone aurantiaca* Schmarda, 1861, and *E. pterophora* Ehlers, 1864, in his new genus *Lugia.* Bergstrom (1914:184) selected Ehlers's species as the type species and included a diagnosis for the genus. Bergstrom (1914:201) also retained Schmarda's species in *Eteone.* In her Catalogue, Hartman (1959: 154) incorrectly listed Schmarda's species as the type species of *Lugia*; this was followed by Fauchald (1977:49).

Uschakov (1958:204) added *Lugia rarica* from the Kurile-Kamchatka trench but later (1972:121, 1974:116), referred it to *Mystides rarica,* based on the lack of dorsal cirri on segment 3.

Uschakov (1972:116, 1974:113) added *Lugia abyssicola* from abyssal bottoms off Japan and the Pacific Ocean off California.

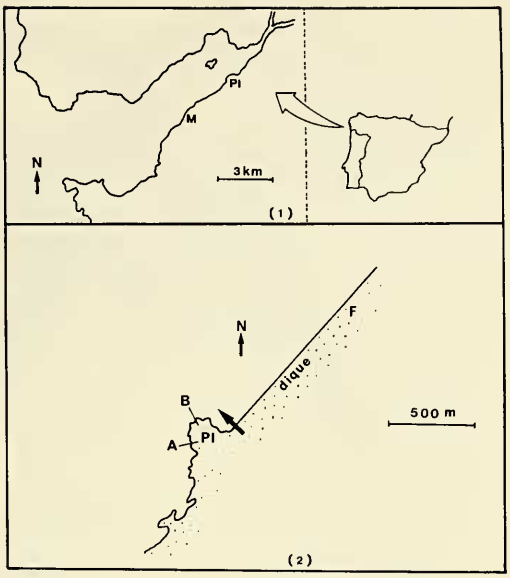

Fig. 1. (1) Map of the ría de Pontevedra showing the Península of Placeres, Pl (with two sampling stations) and Mogor, M (the third sampling station); (2) Detail of the Península of Placeres showing the location of two sampling stations, A and B, and the industrial complex, F. The location of the sewer is marked by the arrow. (Dique = Dike).

Campoy & Alquézar (1982:123) and Alós, Campoy & Pereira (1982:143) added *Lugia incognita* from the Iberian Peninsula.

Lugia atlantica differs from *L. pterophora,* which is characterized by setae with smooth blades (without serrations and striations), lacking simple setae, and by the presence of a very elongate prostomium (Ehlers 1864:pl. 6, figs. 22–25; Fauvel 1923:fig. 63i).

There are ecological and morphological differences between *L. atlantica* and *L. abyssicola,* the later inhabiting the abyssal zone and lacking eyes and simple setae (Uschakov 1972, 1974:figs. 1–5).

Lugia atlantica differs from *L. incognita,* the latter having much shorter and rounded tentacular cirri with rounded tips, dorsal cirri, lacking simple setae and with fewer compound setae per parapodium (Campoy & Alquézar 1982:fig. 2A–F).

Etymology.—The name *atlantica* is pro-

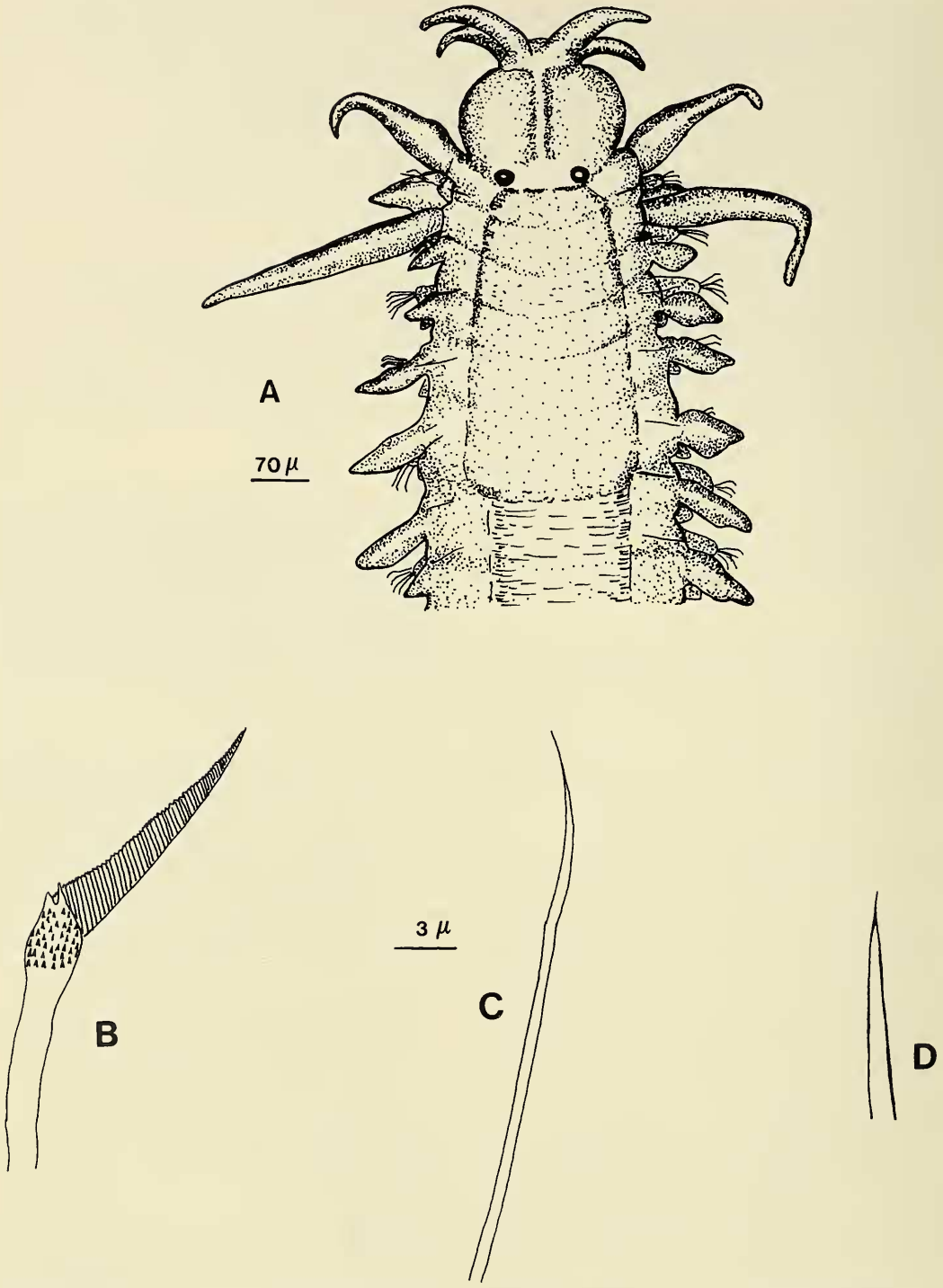

Fig. 2. *Lugia atlantica* holotype. A, Dorsal view of anterior region; B, Compound setae; C, Simple setae from posterior parapodium; D, Aciculum.

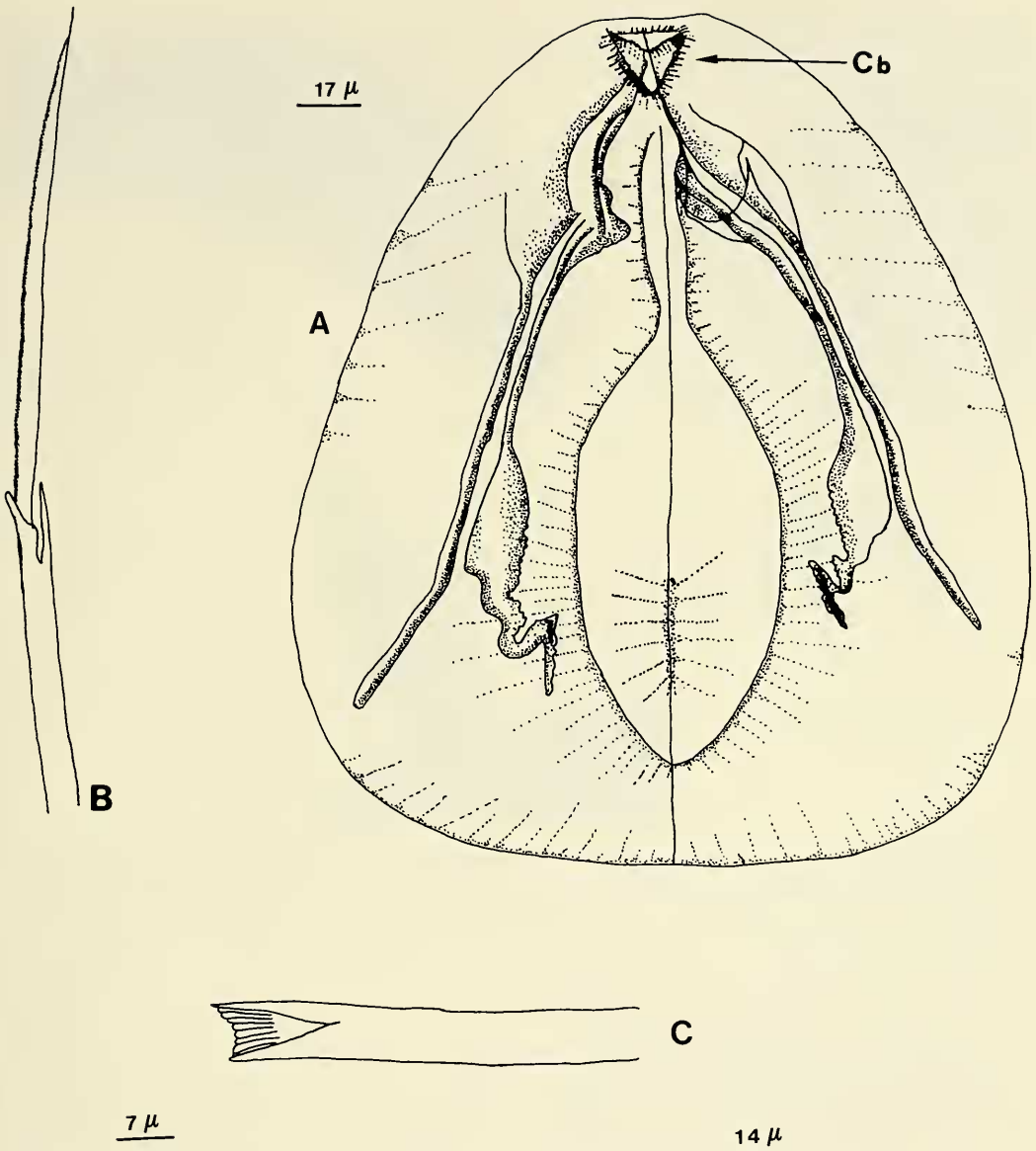

Fig. 3. *Micronereis* sp. A, Pharynx of male with jaws and buccal cavity (Cb); B, Compound homogomph setae; C, Shaft of compound setae showing articulation.

posed because this is the first time specimens of the genus *Lugia* have been found in the Atlantic Ocean. The others have been described from the Mediterranean Sea (*L. pterophora, L. incognita*) and the Sea of Japan and the Pacific Ocean (*L. abyssicola*).

Family Nereididae Johnston, 1845
Genus *Micronereis* Claparède, 1863
Micronereis sp.
Figs. 3, 4A.

Material examined.—Sta M. Lowest intertidal band, 1 male specimen.

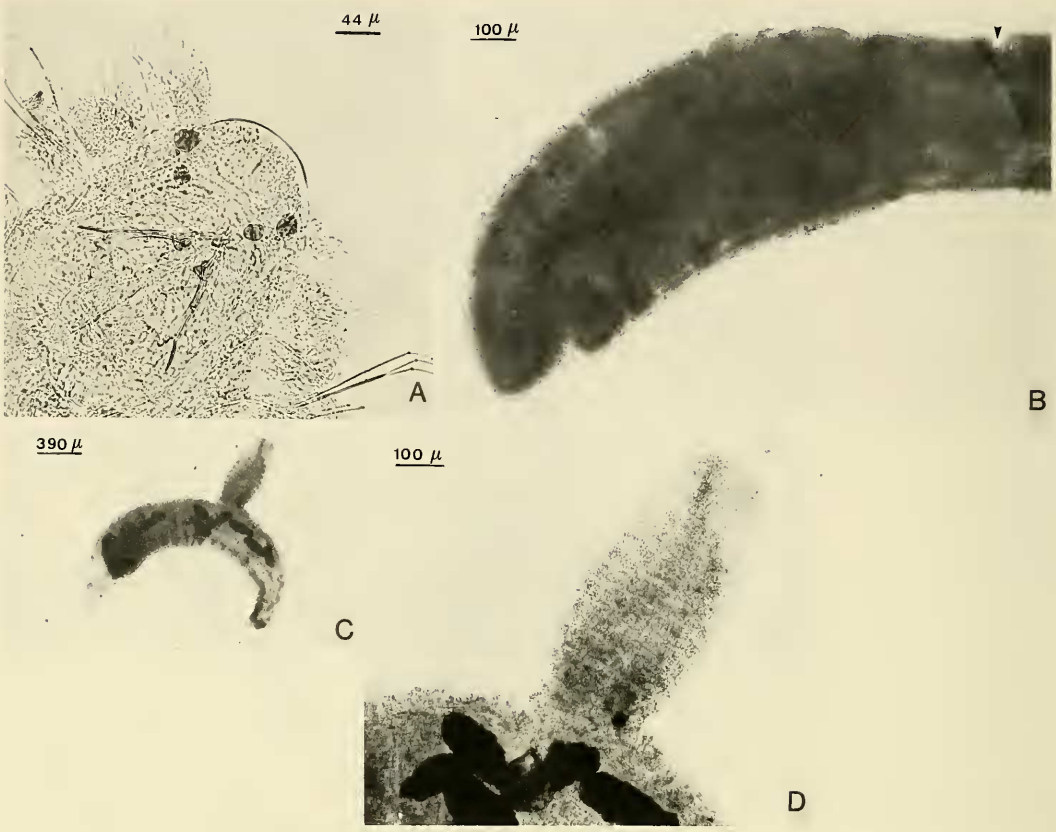

Fig. 4. A, *Micronereis* sp. Dorsal view of anterior end showing jaws, one of right tentacular cirri detached by manipulation; B, Capitellidae indet., thoracic region showing genital hook between setigers 9 and 10 (arrow); C, *Capitella capitata* (?), fragment of abdominal region with bud-like expansion; D, *Capitella capitata* (?), abdominal fragment, enlarged.

Description.—Body flat, 2 mm long and 0.6 mm wide excluding setae, with 16 setigerous segments. Prostomium broad, slightly bilobed, distinct from peristomium, with 2 pairs of eyes in trapezoidal arrangement, anterior pair slightly larger and laterally located along maximum width, posterior pair located in posterior portion of prostomium (Fig. 4A). Paired lobes located anteroventrally, called palps after Paxton (1983). Tentacular cirri 4 pairs with broad bases, gradually tapering distally. Anterior 2 pairs lateral to prostomium, of similar length; posterior 2 pairs slightly longer, lateral to peristomium, one pair anterior and ventral, other pair posterior and dorsal (Fig. 4A).

Pharynx with 2 yellow jaws extending from peristomium to setiger 2. Jaws of male consisting of 2 regions: base with 3 teeth, broadest of them with 8 denticles. Base continuing distally into slender prolongation ending in 2 round expansions and sharp tip; buccal cavity with circle of many rows of very small paragnaths (Fig. 3A).

Setigers 1 and 2 with uniramous parapodia, consisting of setigerous lobe, aciculum, fascicle of setae, and ventral cirrus; dorsal cirrus lacking. Parapodia of following setigers biramous, with divergent rami.

Dorsal and ventral cirri similar in length. Acicula sharp-pointed with straight tips. Compound setae with homogomph articulations, with joint slightly crenulate; smooth shafts without transverse septa and long blades slightly serrate, sharp-pointed. Each neuropodium of setiger 3 with pair of copulatory hooks. Anal cirri lacking.

Remarks.—The taxonomic status of this genus has been studied and changed in different reviews (Reish 1961, Banse 1977, Buzhinskaya 1981, Paxton 1983). Our specimen cannot be included with conviction in any of the valid species that Paxton (1983) considered. The specimen differs from *Micronereis nanaimoensis* Berkeley & Berkeley, 1953, *M. halei* Hartman, 1954, *M. eniwetokensis* Reish, 1961, and *M. bansei* (Hartmann-Schröder 1979) because all of them have shortened type of jaws. Our specimen also differs from *M. ochotensis* Buzhinskaya, 1981, with different kind of jaws, shafts of compound setae with septa and blades with much more conspicuous denticles. It differs from *M. minuta* (Knox & Cameron 1970), with accessory parapodial cirri and simple setae, lacking copulatory hooks, and blades of the compound setae very coarsely serrated. It differs from *M. piccola* Paxton, 1983, in having ocular spots on the segments, compound falcigers, and shafts with septa.

Our specimen does not completely agree with *M. variegata* Claparède, 1863. The main difference resides in the shape of the jaws, this character being the most useful for the diagnosis of this species (Amoureux et al. 1978). Paxton (1983) could not examine the holotype of the species. Based on specimens that she considered similar to the original, however, she offered a drawing of the jaws of a male, which differ from our specimen. Other characters established by this author, those related to number of setigers, length, and setae, are similar to our specimen. In spite of these differences, we consider that one specimen is not enough to establish a new taxon.

Family Capitellidae Grube, 1862
Capitellidae indet.
Fig. 4B

Material examined.—Sta A, intertidal band of *Ulva rigida*, complete specimen and one without abdominal region.

Description.—The external appearance agrees with *Capitella capitata* (Fabricius 1780), except for copulatory apparatus located between setigers 9 and 10, instead of 8 and 9 (Fig. 4B). Setigers 1 to 6 with capillary setae exclusively. Parapodial rami of segment 7 with hooded hooks, except right ventral ramus with capillary setae. Setiger 8 with hooded hooks exclusively. Setiger 9 and 10 with hooded hooks in ventral rami and genital hooks in dorsal.

Remarks.—We have not found in the literature any genus of this family with the copulatory apparatus between setigers 9 and 10. These specimens could lead to the establishment of a new genus, but we prefer to wait for new findings of specimens with this character, especially from unpolluted areas.

Genus *Capitella* Blainville, 1828
Capitella capitata (Fabricius 1780)
Fig. 4C, D

Material examined.—Sta A, intertidal band of *Ulva rigida*, fragment of the abdominal region of a specimen belonging very likely to *Capitella capitata*. It bears a lateral segmented bud-like expansion with hooded hooks in every segment, showing the typical arrangement for the species.

Remarks.—We have not found any reference in the literature pointing out the possibility of budding in this family. Using high levels of heavy metals in culture, Reish (1974, 1977) obtained larvae of this species with bifurcated abdomens. These abnormal specimens, however, never passed the 8-segmented metatrochophore stage. The fragment we are reporting belongs to an adult specimen. We do not discount the idea that the bud-like expansion may be a kind of

anomaly caused by the industrial pollution of the area.

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Literature Cited

Alós, C., A. Campoy, & F. Pereira. 1982. Contribución al estudio de los anélidos poliquetos endobiontes de esponjas.—Actas del II Simposio Ibérico de Estudios del Bentos Marino 3:139–157.

Amoureux, L., F. Rullier, & L. Fishelson. 1978. Systematique et ecologie d'annelides polychètes de la presqu'il du Sinai.—Israel Journal of Zoology 27:57–163.

Banse, K. 1977. A new subfamily, Notophycinae (Polychaeta: Nereididae), for *Micronereis* Claparède and *Quadricirra* new genus. Pp. 115–140 *in* D. J. Reish, and K. Fauchald, eds., Essays on polychaetous annelids in memory of Dr. Olga Hartman. Allan Hancock Foundation, University of Southern California, Los Angeles.

Bergstrom, E. 1914. Zur Systematik der Polychaetenfamilie der Phyllodociden.—Zoologiska Bidrag fran Uppsala 3:37–224.

Buzhinskaya, G. N. 1981. On taxonomic status of the genus *Micronereis* Claparède, 1863 (Polychaeta, Nereidae).—Zoologischesky Zhurnal 60: 1256–1261. [In Russian, English summary].

Campoy, A., & E. Alquézar. 1982. Anélidos Poliquetos de las formaciones de *Dendropoma petraeum* (Monterosato) de las costas del Sureste de España.—Actas del II Simposio Ibérico de Estudios del Bentos Marino 3:121–137.

Ehlers, E. 1864. Die Borstenwürmer (Annelida Chaetopoda), vol. 1. Wilhelm Engelman, Leipzig, 268 pp.

Fauchald, K. 1977. The Polychaete worms. Definitions and keys to the orders, families and genera.—Natural History Museum of Los Angeles County Science Series 28:1–188.

Fauvel, P. 1923. Polychètes Errantes.—Faune de France 5:1–488.

Hartman, O. 1959. Catalogue of the polychaetous annelids of the world.—Allan Hancock Foundation Publications, Occasional Paper 23 (I)2: 1–628.

Paxton, H. 1983. Revision of the genus *Micronereis* (Polychaeta: Nereididae: Notophycinae).—Records of the Australian Museum 35(1):1–18.

Quatrefages, A. de. 1866 (1865). Histoire naturelle des Annelés marins et d'eau douce. Annélides et Gephyriens.—Librairie Encyclopédique de Rôret, Paris 2(1):1–336.

Reish, D. J. 1961. A new species of *Micronereis* (Annelida, Polychaeta) from the Marshall Islands.—Pacific Science 15:273–277.

———. 1974. Induction of abnormal polychaete larvae by heavy metals.—Marine Pollution Bulletin 5(8):125–126.

———. 1977. Effects of chromium on the life history of *Capitella capitata* (Annelida: Polychaeta). Pp. 199–207 *in* F. J. Vernberg et al., eds., Physiological responses of Marine Biota to pollutants. Academic Press, New York.

Uschakov, P. V. 1958. Two new species of polychaetes belonging to the family Phyllodocidae from the abysses of the Kurile-Kamchatka Trench.—Trudy Instituta Okeanologii 27:204–207. [In Russian]

———. 1972. Polychaetes. Pp. 1–271 *in* Fauna of the U.S.S.R. Academy of Sciences of the U.S.S.R., Zoological Institute, I. [In Russian, English translation, Israel Program for Scientific Translations, Jerusalem, 1974:1–259.]

Villalba, A., & J. M. Viéitez. 1985. Estudio de la fauna de anélidos poliquetos del sustrato rocoso intermareal de una zona contaminada de la ría de Pontevedra (Galicia). I. Resultados biocenóticos.—Cahiers de Biologie Marine 26:359–377.

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